

Relationship of Phylloxera Infestation Level to Leaf Water Potential

Addendum to

Assessment of Leaf Area, Vine Vigor, and Grape Yield and Quality of Phylloxera-Infested and Non-Infested Grapevines in Napa County and Their Relationship to Leaf Reflectance, Chlorophyll, and Mineral Content

Final Report

NCC2-5062

March 8, 1996

by

Richard W. Baldy and Marian W. Baldy¹

John A. De Benedictis, Jeffrey Granett, and Bryan P. Osborn²

Andy Bledsoe and Daniel Bosch³

Christine Hlavka⁴ and Lee Johnson⁵

Ed Weber⁶

¹School of Agriculture, California State University, Chico, CA 95929-0310

²Department of Entomology, University of California, Davis, 95616

³Robert Mondavi Winery, P. O. Box 106, Oakville, CA 94562

⁴Ecosystem Science and Technology Branch, NASA Ames Research Center, MS 242-4, Moffett Field, CA 94035

⁵Johnson Controls, NASA Ames Research Center, MS 242-4, Moffett Field, CA 94035

⁶University of California Cooperative Extension, 1710 Soscol Ave., Suite 4, Napa, CA 94559

Rationale

Grape Phylloxera damage grapevines by feeding on roots. Vines with damaged roots may be less able to replenish their leaves with water than vines with healthy roots. If these vines with damaged roots continue to transpire at the rate of healthy vines, their leaves should exhibit lowered water potentials.

Methodology of Water Potential Measurement

On July 14, 1994, mature, fully exposed leaves oriented more-or-less perpendicular to the sun were cut near the cane retaining the petiole attached to each leaf. Each cut leaf was immediately placed individually into a Ziploc™ bag which in turn was placed into a Styrofoam insulated chest at ambient temperature. Four leaves were removed per plot at each sampling time. One leaf was removed from each of the four blue vines in one of the two rows with blue (spectral) vines in each plot. The row sampled in each plot was alternated with sampling time. Leaves were removed from their bags and measured with a PMS (Plant Moisture Stress) model pressure chamber. Sampling and pressure measurement began at 5:55 AM and ended at 5:50 PM. Plots 3, 4, 5, 6, 9, and 12 were sampled. The results are shown in the Figure.

On July 26 Phylloxera infestation levels were estimated for the blue vines by digging root samples from red vines. Phylloxera readings were averaged by plot .

Table: Average Phylloxera rating on July 26, 1994, by Plot.

plot number	Average phylloxera rating
3	1.56
4	1.81
5	0.94
6	1.25
9	0.00
12	0.44

Results and Conclusion

The differences in water potential between severely infested (plots 3 and 6) and non-infested (plots 9 and 12) vines were inconsistent and pressure bomb measurements do not show promise for distinguishing between mildly infested and non-infested vines.

